# Exercises: Strings and Streams

This document defines the exercises for the ["C++ Fundamentals" course @ Software University](https://softuni.bg/trainings/4263/cpp-fundamentals-november-2023).

Please submit your solutions (source code) of all below-described problems in [Judge](https://judge.softuni.org/Contests/2941/Strings-and-Streams-Exercises)

## Valid Usernames

Write a program that:

* Read **usernames** on a single line (joined by "**,** ")
* Prints all **valid usernames**

A **valid** username is:

* Has a length of between **3 and 16 characters (inclusively)**
* It contains only **letters, numbers, hyphens (-)** and **underscores (\_)**

### Examples

|  |  |
| --- | --- |
| **Input** | **Output** |
| sh, too\_long\_username, !lleg@l ch@rs, jeffbutt | jeffbutt |
| Jeff, john45, ab, cd, peter-ivanov, @smith | Jeff  John45  peter-ivanov |

## Caesar Cipher

Write a program that:

* Read a text from the first line of the console
* Encrypt the text by shifting each character with three positions forward.

**Example:**

* A would be replaced by D
* B would become E
* P would become S
* Print the encrypted text

### Examples

|  |  |
| --- | --- |
| **Input** | **Output** |
| Programming is cool! | Surjudpplqj#lv#frro$ |
| One year has 365 days. | Rqh#|hdu#kdv#698#gd|v1 |

## Replace Repeating Chars

Write a program that:

* Reads a **string** from the console
* Replaces **any sequence of the same letters with a single corresponding letter**
* Print **resulting string**

### Examples

|  |  |
| --- | --- |
| **Input** | **Output** |
| aaaaabbbbbcdddeeeedssaa | abcdedsa |
| qqqwerqwecccwd | qwerqwecwd |

## Character Multiplier

Write a program that:

* Reads **two strings** from the console, **separated by single space**
* **Calculate the sum of strings character codes multiplied (multiply str1[0] with str2[0] and add to the total sum) and continue with the next two characters**
* Print the calculated sum

**Note:** If one of the strings is longer than the other, add the remaining character codes to the total sum without multiplication.

### Examples

|  |  |
| --- | --- |
| **Input** | **Output** |
| George Peter | 52114 |
| 123 522 | 7647 |
| love SoftUni | 45337 |

## Mathematical Expression

Write a program that:

* Reads a line from the console containing a mathematical expression
* Check whether the brackets in the expression () are placed correctly
* Print "correct", if the brackets are placed correctly
* Print "incorrect",if the brackets are placed incorrectly

**Note:** Assume everything else is correct, you don't need to check for correct signs, correct variables / numbers.

### Examples

|  |  |
| --- | --- |
| **Input** | **Output** |
| ((a+b)/5-d) | correct |
| a+b | correct |
| a+(b) | correct |
| ((a+b)/5-d | incorrect |
| (a+b | incorrect |

## Title Case

### Write a program that:

* Reads a **text from the first line of the console**
* Changes each word in **a text to start with a capital letter**
* Print the **resulting string**

**Note:** The first letter of a word is an English alphabetical symbol preceded by a non-alphabetical symbol. So in "we will--rock you", "we", "will", "rock" and "you" are all considered words which need to be capitalized.

### Examples

|  |  |
| --- | --- |
| **Input** | **Output** |
| On the south Carpathian mountains,a tree is swinging | On Тhe Сouth Carpathian Мountains,А Тree Is Swinging |
| Write aprogram that changes each word in | Write AProgram Which Changes Each Word In |

## Replace All

Write a program that:

* Read a **text** from the first line of the console
* Read a "**find" string** from the second line of the console
* Read a **"replace" string** from the third line of the console
* Any part of the text which matches the **"find" string should be replaced with the "replace" string**
* Print the resulting text on the console

### Examples

|  |  |
| --- | --- |
| **Input** | **Output** |
| I am the night. Dark Night! No, not the knight night day | I am the day. Dark Night! No, not the kday |
| This is a test string. Such a funny string!  string  life | This is a test life. Such a funny life! |

## Invalid Input

Write a program that:

* Read a line **containing integer numbers**, separated by space from the console
* Calculate **sum of the entered numbers**
* Print the **calcualated sum**
* In addition to the numbers, **each line will contain one or more words**
* Print **those words** on a separate line, separated by spaces, **after the sum, in the order, they were in the input**

### Examples

|  |  |
| --- | --- |
| **Input** | **Output** |
| 1 2 3 invalid 4 | 10  invalid |
| H 2 adasashd oneTwo -1 4 | 5  H adasashd oneTwo |
| 0 HELLO 13 -5 ten 10 14 Noise | 32  HELLO ten Noise |